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By W. W. KEEN, M.D.,
Professor of the Principles of Surgery and of Clinical Surgery, in the
Jefferson Medical College.

INTRODUCTORY ADDRESS AT THE OPENING OF THE SIXTY-SIXTH
ANNUAL SESSION OF THE JEFFERSON MEDICAL COLLEGE.

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THE NEW ERA IN MEDICINE AND ITS DEMANDS UPON THE PROFESSION AND THE COLLEGE.¹

By W. W. KEEN, M.D.,

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ON the 8th of October, thirty years ago, I entered the lower lecture-room of the College building for the first time as a medical student, and listened to the Introductory Lecture. It was given by that phenomenal encyclopædia of knowledge, Robley Dunglison, for so many years the Dean and Professor of Physiology in this School. Time has gradually obliterated its then deep impressions, and now three memories alone remain to me. The first is the place where I sat; the second the precept, which has so often since then recurred to my mind in solving the medical problems which have presented themselves to me, that I must not confound the *post hoc* and the *propter hoc*, the sequence with the consequence; and the third was the gracious welcome which that fluent master of English gave to us, the incoming class.

It is my pleasant duty to-night to repeat, after a lapse of so many years, at least the same cordial welcome then extended to me—a welcome to you all, from North and from South, from the Atlantic and the Pacific, and even from far distant foreign shores. Nor is this welcome a merely formal one; it is heart-

¹ Introductory Address at the opening of the Sixty-sixth Annual Session of the Jefferson Medical College.

felt and true. Not only for myself, but on behalf of my colleagues of the Faculty, do I welcome you, as kindly and as earnestly as I possibly can, to the arduous study upon which some of you are about to enter; a welcome, quite as cordial, I also extend to those who have already trodden the thorny path of the first or second year of study, and who have now a better capacity to appreciate what they learn, and a better appreciation of the earnest efforts that will be made by every teacher of the school from the oldest of the Faculty to the latest acquisition among the assistants to the laboratories.

The welcome thus extended is saddened, however, by mournful memories. It is with feelings of deep respect and admiration that I refer, as is proper, to the teacher whose honored place I occupy, whose premature and unexpected death robbed the Jefferson College of one of its brightest ornaments; a man illustrious by his name, and not less honored for his own eminently useful scientific achievements. The warmth of admiration and affection which the older students among you bestowed upon the late Samuel W. Gross, was not ill bestowed, but was well deserved. Professionally he knew but one thing—Surgery. Even from his very entrance on his profession, this was his chosen department, and to it he devoted laborious days and studious nights. As a teacher he was incisive, progressive, well read, versatile, and accomplished. He was no uncertain and hesitating teacher, but gave you, in his own clear-cut and positive way, the best results of the foremost minds of the profession, both of this country and of Europe. Many of you can testify to his devotion to his subject, his students, and his Alma Mater. He sympathized with your joys, and helped you over the rough places with the utmost gladness. Few schools have had two such ornaments in one family as the elder and

younger Gross ; and in the midst of all the pleasure and hilarity of the opening of the session, it is meet and proper that we should pause a moment to lay a flower on the bier of each.

A moment ago I referred to the time when I myself began the study of medicine. You can scarcely appreciate what the study of medicine then meant, as compared with what it means to-day. About the time that I began, the custom had just ceased for each member of the Faculty to deliver an Introductory Lecture to his course each year. The session began on the second Monday in October, and the entire first week was given up by the Faculty to the daily Introductions, and by the students to more or less of revelry, as might become both their consciences and their purses. In the next week we settled down to greater or less regularity of life. The session continued until the end of February, and not a few men of the first year, like Charles Lamb, made up for coming late by going early. Examination over, the iron gate that used to guard the Tenth street entrance to the College swung heavily to, and was not opened again until the next October.

There were no laboratories. Apart from the seven classical branches there was absolutely no official instruction. No man was required to study physical diagnosis, or minor surgery, or chemistry, or the microscope, either in histology or morbid anatomy ; and perhaps not a score of men in any graduating class had ever seen a muscular fiber cell, or striped muscular tissue, or a nerve cell, or a nerve tubule. The fortunate few who, in the offices of private preceptors, had a chance to give a wondering look from time to time through a microscope ; to examine the urine for tube casts, or for any crystalline element, were equally small in number. Nor were there more who were ever taught to test the urine for albumin. The only

histological reagents were acetic acid for clearing up a specimen, and carmine to color it, and the hand-held razor was the only microtome. There was no laboratory of physiology, no teaching of pathological anatomy, no instruction in pharmacy. Nor could any man properly write his first prescription, unless he had been privately taught by his quiz master or his preceptor. The only clinical instruction was in medicine and surgery, neither obstetrics, gynecology, nor any of the specialties being recognized. Indeed, a specialist was looked at askance, as a very questionable sort of doctor.

The seven months intervening between February and October were presumably spent with one's preceptor at home. How much each student would learn in that time, I leave you to judge as leniently as possible. During the spring and fall, however, there were open a few private lectures from voluntary associations of teachers, some of whom, now occupying honored places, I see about me. But these advantages were limited almost exclusively to the students who lived in the city. The examinations were easy, and for the disabled students an "omnibus" was prepared to carry them to, if not through, the perils of the "Green-room."

Contrast this with the opportunities that you have to-day. Every student has now the opportunity to become versed in bandaging, the application of fracture dressings, and the performance of all the ordinary surgical operations on the cadaver. All of you will have had some practice and careful clinical instruction in physical diagnosis. All of you will have attended lectures on pathology and have made a more or less careful personal study of both normal and diseased structures with the microscope. All of you will have passed through the laboratories of physiology, of materia medica, of experimental therapeu-

tics, of pharmacy, of chemistry, and have studied especially the chemistry of the urine and other secretions and excretions of the body. All of you will have had careful instruction in practical obstetrics, in obstetrical examinations, and gynecological operations. All of you will also have had instruction in diseases of the eye, the ear, the throat, the nose, in electricity, toxicology, orthopedics, diseases of the skin, diseases of children, and insanity, not one of which at that time was officially taught in this or in any other medical college.

This immense change smacks almost of revolution. But there is need of a new and fresh overturning. The last few years have seen such rapid movement and progress in every department of medicine that we stand practically in a "New Era in Medicine," and the new era makes new demands both upon medical colleges and the medical profession to which, if we be blind, we shall be derelict in our duty, both to ourselves and the public.

Let us for a moment take a bird's eye view of these changes. First of all a wholly new department of medical science, Bacteriology, has been created. Rejected at first by most, and only doubtfully and hesitatingly believed in by many, except some prophets of the dawn endowed with finer vision than the rest, it has achieved within the last ten years a positive and now practically unquestioned place in medical science. Its revelation of the causes of many diseases and its explanation of their phenomena are as startling as they are well substantiated. That suppuration and erysipelas, tetanus and leprosy, consumption and cholera are parasitic diseases due to the invasion of the body by various forms of micro-organisms is a discovery of the first importance, and much too near as yet for us to appreciate its far-reaching influence. It has but begun its infant career. It must speedily

grow into one of the most weighty of the scientific departments of medicine, and bids fair to revolutionize our practice as much as it has our theories.

The old *Materia Medica* and *Therapeutics* have been rewritten within the last few years in the *Pharmacology* of the present day. The actual daily use of medicine has been marvelously changed of late by experiments made to discover the real physiological and therapeutical action of remedies; their effects upon the heart, the arteries, the brain, the respiration, the kidneys; their medicinal and their toxic doses and effects; and from these facts to deduce a right and rational use of drugs. Besides this the extraordinary number of new drugs and the numberless new methods of their administration, the present scientific use of massage and of electricity in its various forms, the increasing use of Swedish movements, of heat, of cold, of mechanical means for soothing and stimulating nerves and muscles, and for spinal extension are all additions of the last few years.

Allied to this there is virtually a "New Chemistry," not only in the sense in which the term is used by Prof. Cook. Organic chemistry has by its analytic methods given us many of the new drugs already alluded to, and by its synthetical combinations has even produced them in the laboratory instead of waiting for Nature's slow distillation by long growth; and has by its substitution compounds given us different series of remedies of immense value, all built upon a single base.¹

Chemistry and pharmacology, with physiological physics, embryology, and experimental physiology, have developed a new Physiology.

¹ If any one doubt the existence of a new-visaged and promising chemistry and pharmacology, let him only read the recent lectures of Dr. Lauder Brunton, in the *British Medical Journal*, On the Relation between Chemical Composition and Physiological Action.

Even Anatomy, a field of stubble scarce worth a gleaner's searching eye as was supposed by many, has rewarded the industrious toiler by rich and full sheaves. Even in gross anatomy, to name no other, the mapping of the convolutions of the brain, and determining their functions, by Ferrier, Horsley, and others; the study of surface anatomy in its relations to the interior, by Holden; the careful study of the intestinal canal by Treves, have been of immense service: while embryology and histology and comparative anatomy have reformed a large part of the science.

These scientific departments are the foundation upon which are built surgery, medicine, obstetrics, and gynecology, the practical departments of the healing art. These, too, like Samson of old, have burst the withs and ropes of the past and risen up in renewed strength, and have gone forth conquering and to conquer.

In Surgery and Gynecology the effects of experiments upon animals, of bacteriological studies, and of the antiseptic method, have been almost past belief. The mortality of amputations has been reduced from twenty-five to fifty per cent. down to from four per cent. to zero, and compound fractures, instead of yielding a holocaust of fifty to sixty per cent., are now, if rightly treated, scarcely more dangerous than simple fractures. The abdomen, instead of being forbidden ground like the lost Eden, with the peritoneum for its "flaming sword which turned every way to keep the way of the tree of life," might almost be called a playground in which surgeons disport themselves to their heart's content, inventing new operations as children invent new games; not an organ contained in its once sacred interior, or in that of the pelvis, is free from attack, and for the most part, happily, with as great relief to the patient as pride

to the surgeon. The brain, till five years ago the most dreaded organ in the body, is now not only freely exposed without serious danger, but portions of it excised, abscesses opened, the ventricles irrigated, and tumors removed. Bones are sawn or wired; joints are opened; the chest is invaded, and the lungs are resected. These and other operations successfully done are witnesses to the new era in general surgery¹ and gynecology, while in each special branch of surgery the same could be shown to be true had I only the time.

In Medicine and Obstetrics the same progress is noted in newer and better treatment of many of the ordinary diseases and the usual obstetric conditions. The diminution of the mortality rates is simply extraordinary; and often the new methods of treatment are as simple and grateful as they are successful. To name but one department of each: Our acquaintance with diseases of the nervous system has grown so rapidly that a text-book of thirty years ago is apt to elbow Galen and Avicenna for sympathy in its neglect, while the mortality of the puerperal state has been reduced by the introduction of antiseptics almost to a vanishing point.

Of the many specialties in medicine I cannot take time to speak, save to note the fact that they all have been created or remodeled within the last twenty years.

In view of these facts, am I not justified in calling this "The New Era in Medical Science?"

It will be the duty, the privilege, and the joy of the teachers in this flourishing and progressive school of medicine to give to you the details of this fascinating

¹ I have given in a popular form a fuller account of this Recent Progress of Surgery, in *Harper's Magazine* for Oct., 1889.

medical romance in the course we are now entering upon, and I envy you the privilege of engaging in this study thirty years later than I. I have not used the word "faculty," but "teachers;" first, because I wish to recognize and I wish you to recognize the worth and zeal of the junior teachers associated with us, both in the college and the hospital; younger men who freely give of their time to aid you, and largely for the pure love of science. The best and highest reward that ever comes to them, as to us, or to any mortal, is the inward glow and satisfaction of good work done in scientific research, of an enlargement of the domain of truth, be it ever so little. "I labor less," said Fresnel, "to catch the suffrages of the public than to obtain that inward approval which has always been the sweetest reward of my efforts. Without doubt, in moments of disgust and discouragement, I have often needed the spur of vanity or emolument to excite me to my researches. But all the compliments I have ever received from Arago, de la Place, or Biot, never gave me such large pleasure as the discovery of a theoretic truth or the confirmation of a calculation by experiment."

The word "teacher" also designates us all as members of one of the noblest guilds in the world. For twenty-four years I have also myself glorified in the name and work of a teacher, and desire no better title. It is said that when Agassiz's will was opened it ignored all his other proud titles and began majestically "I, Louis Agassiz, teacher . . ."

The new era in medicine so inadequately described now confronts the profession, and especially you, gentlemen, who are to practice it, and whose lives will be spent, remember, among the glories of the twentieth century, with the now undreamed of progress of that happy time. It confronts you as a mighty master, with uplifted hand, pointing you upward and onward ;

onward to the laborious but great and splendid work awaiting your touch, and upward to the prizes for the foremost and worthiest. But it makes also its demands, its inexorable demands upon you. Satisfy them you must, or fail.

Let us look for a few minutes at what these demands upon the profession are.

A physician's life consists of three periods; corresponding to those of his preliminary education, his medical college course, and his active life as a practitioner. These may be called the Pre-collegiate, the Collegiate, and the Post-collegiate periods, and I purpose speaking in a plain and practical way of each.

1. The Pre-collegiate period, or that of preliminary training.

The ideal medical college would perhaps insist that this be nothing short of a complete liberal education, such as is given in our American colleges and universities, and it is an encouraging feature of the times that the proportion of such college graduates now in our medical schools is steadily on the increase, and that one of our numerous medical societies is composed wholly of those who have received not only the degree in medicine, but that in arts as well. Native talent and hard work will always tell, but such talent when trained and set at work will accomplish vastly more. But this is a world of imperfections and limitations in which the Utopia of the ideal-best must give place to the cold matter-of-fact attainable-best. Desirable as it might be that all of the profession should have such a complete preliminary training, we all acknowledge it to be impossible, at least at present. But such a preliminary education as would at least fit a man to enter the freshman class at our ordinary colleges before many years past must be, in my opinion, a pre-requisite to the study of so wide, so progressive, so logical, and so exacting a science as medicine s

it now exists. If necessary to fit a man to study the ordinary college branches, it would seem *a fortiori* to be necessary for such technical study. Even this we cannot expect at once. But it must be the goal toward which we must strive. I congratulate you and the Jefferson College most heartily on the inauguration this year of an entrance examination—a real, though a moderate one—a beginning that is but a herald, I hope, of more exacting examinations in the future, as thus we grow up to our privileges and opportunities. Moreover I must not forget that I am addressing those who have concluded this first period, and who have already entered, or are about to enter, upon the second. Those of you who have had a complete preliminary training I congratulate, and at the same time I remind you that more is to be expected and exacted from you than from others. Should you pride yourselves upon the privilege and relax your efforts in the least degree, remember that the tortoise once beat the hare, and can do it again.

To those of you that have not had such a preliminary training, the question arises, What shall you do? Recognize honestly the defect and go to work manfully to make up for it just as far and as fast as you can. You can do but little of this, perhaps, during your college course. In the winter you will have no time, and I feel chary of your using your summer holidays for much hard work. But if not now, then so soon as you graduate, when your conspicuous patients—conspicuous by reason of their rarity—leave you plenty of unasked for leisure, then you must begin with zeal to complete such a desirable education. But more of this hereafter.

2. The collegiate period, or that spent in a medical college.

I will not spend time in a repetition of the trite maxims inculcating due diligence, hard work, regular

attendance, close attention, and all that. You were once boys who needed mental and possibly even corporal flagellation. But you are past that period, and are now young men. Not that you have outgrown the need for these virtues, but that we take it for granted that you have them and will use them. We have no rules and no roll call for these very reasons. You are placed upon your honor to do your very "level best." "Education," it has been wittily said, "is the only thing in which we try to get the least for our money." It is for you to prove its falsity.

In the brief time you will spend here we can tell you but little of the immense array of facts in medicine. You will learn much it is true ; but compared with what you do *not* know, what you *will* know when you graduate will be as nothing. The chief services of a medical college are twofold. First, it will give you the great principles that underlie each department, with the main facts that prove them. But secondly, and if possible even more important, it will give you an impetus in the right direction. The use of a cannon is to compel the ball to follow its proper path. The gun is but a few feet long but the impetus and guidance it gives in those few feet are unalterable. The huge missile follows its course to its goal. If the gun is aimed low its path will be low and its goal will be near ; but if the aim be high it will cover miles in its course and triumphantly strike its distant target. Enter then here into the enthusiasm of the place and the time. Catch the scientific spirit pervading the very atmosphere of the place. Let it permeate every fiber of your mental structure. Let it be your meat and drink, your very life. This short period is to give you the "bent," "the set," the "curve" of your whole later professional life. See to it that you use it well.

Remember, however, that while we can "teach," it is you that must "learn." We can but spread the rich feast. It is you who must eat and assimilate it. We give "instruction," you must transfer it into an "education," and make it an abiding possession. "Pray, Mr. Opie," said a visitor to the artist, "what do you mix your colors with?" "With brains, sir," was the brief but pregnant answer.

But while inculcating all this diligence and enthusiasm let me caution you to see to it that your health does not suffer; not perhaps from too much work, but rather from unwise methods of work. The daily bath and a proper amount of exercise will go far to counteract the bad air of the lecture and dissecting rooms. Get to bed early; then you know you can get up early, which you all so much long for. Study none on Sunday. Being medical students does not release you from the moral and religious duties and pleasures of the Sabbath—the day of rest—here any more than at home; and a complete change in the current of your thoughts is no less refreshing than it is physiological. One of the worst evils of our present system of education is cramming for examination. A reasonable review of bygone lectures is wise and useful, but cramming is quite another thing. It means that you have been lazy and derelict during the winter, and to make up for lost time, you ram and cram your heads full of a mass of unassimilated facts to dole them out parrot-like to the too inquisitive professor. I cannot better present its evils than by quoting from that wise old Grecian Epictetus, for it seems to be a very hoary vice: "It is," says he, "as if sheep after they have been feeding, should present their shepherds with the very grass itself which they had cropped and swallowed to show how much they had eaten, instead of concocting it into wool and milk." Next April, remember,

we don't want the "grass," but the "wool and milk."

You will learn the use of many new and valuable instruments: The microscope, otoscope, ophthalmoscope, laryngoscope, and all other "scopes;" the many specula, aural, oral, nasal, vaginal, rectal; many beautiful and useful refinements in chemical reactions and in pathological appearances, all useful as means of diagnosis. You must master them all. They are the tools of your profession. If you miss learning their use now you may never again have the chance. In the remote West, in a small country village in the East, or elsewhere, you will sometimes sorely need them, when you will have no willing professor or quiz master to whom you may appeal. They will help you in a multitude of cases, and often are simply indispensable.

But I want to urge you to do one thing more; to combine with all of our nineteenth-century inventions, eighteenth-century shrewdness of observation, and acute cultivation of the normal, unassisted senses, in order to make up the more perfect doctors of the twentieth century. If you have not read "Spare Hours," by the lovable and accomplished Dr. John Brown, of Edinburgh, the author of "Rab and His Friends," that most charming medical story, you have a treat before you. Some pages are more succulent than others, but there is not a sterile patch among them. In the third series you will find most of the medical papers, and they are bracing reading for a doctor. I know nowhere a stronger plea for this very education of the senses which I wish to urge upon you. As there were heroes before Agamemnon, so eyes and ears existed before oxygen was known or Laennec lived, and our forefathers had sharp eyes, shrewdly hearing ears, and delicate fingers that had to take the place of the specula and the scopes of our

day. "Every fellow," says the blind but knowing master of wood-craft, in Dr. S. Weir Mitchell's last story, "every fellow ought to be blind ten years, and deaf ten more, and then get his eyes and ears. He'd know a heap, I tell you he would."

Medicine is not a deductive science. We do not start from *a priori* principles and reason to conclusions. It is intensely inductive. We collect our facts, the more the better, as increasing numbers diminish the ever possible chances of error, we collate them in orderly sequence, and gradually rise from facts to principles. Hence if our facts are badly observed, our principles are sure to be erroneous.

I am persuaded that the chief source of errors in diagnosis is not want of knowledge, but careless or insufficient examination into the facts of the disease. I have seen a diagnosis of rheumatism of the knee joint, in a case in which lifting the knee two inches from the bed instantly showed the crepitus from a spontaneous fracture following long existing osteomyelitis. I have been called to a case of hemorrhoids which a glance and a touch resolved into an ischio-rectal abscess; and I have seen days of uncertainty and groping for a diagnosis cut short by a few taps over the back of the lungs that revealed an unsuspected pneumonia. Had the leg been once lifted, the perineum inspected and touched, the posterior chest examined—two minutes only, but two minutes of exactness—no such errors would have occurred.

The eye must be taught to take in much for which no speculum is needful. The physiognomy of the patient, the modes of expression, whether facial or vocal, spontaneously assumed postures of the body, tremulous or steady movements, the color, the breathing both as to frequency and character; the outlines of the body, normal or abnormal; the exact relations of parts; all these, and a hundred more, all stand

with their cup of information filled to the brim for him who will drink. The ear may be aided by the stethoscope, but it must not be trammelled by it. It must be trained to abnormal alertness, and hear every sound, from the normal loud gurgling of the intestines to the faintest suggestion of it while using taxis in a hernia; from the loud tubular breathing of a widespread pneumonia, to the judicious discrimination of the relative respiratory murmur in the apices. The touch, though it can scarcely be educated up to the standard of Laura Bridgman, can give you the needful facts as to hardness, softness, elasticity, resistance, contour, crepitus, and the like, if you will but use it. No instrument can replace it. Let your fingers therefore itch till you have touched and felt every case that by hook or by crook you can lay your hands on. Smell and taste are not seldom called into play, and here at least we can use no artificial helps. Yet they are sorely neglected with all the other senses. The epicure in Juvenal's day could distinguish between an oyster from the Lucrine Lake or from Britain. We could do as much were we to cultivate our natural powers as well. Cultivate these senses largely by a study of your own body. *Haud inexpertus loquor.* The hours I have spent in such study have been among the most remunerative, not only in the facts learned, but in the exact methods acquired, and the fine filing of the senses to a cultivated acuteness.

In all this I would not decry the use of the modern instruments of precision. Their introduction marks the beginning of modern science; when the balance, the yard stick, and the pendulum took the place of vague guessing at weight, length, and time. But, back of all our medical instruments, without which they are almost worthless, are our natural senses; and, if generously cultivated, they will largely replace them. Fifty instruments, though

they can help, can never replace the five senses. In mountaineering, the Alpenstock is invaluable as an aid ; but it can never take the place of a stout pair of legs.

This careful development of the senses must foster a spirit of exactness in all your work ; in the use of instruments of precision as well as of the senses themselves. Science is always hostile to the word "about"—"about three inches long," "about one hundred and one degrees," "about ten days." When it is so easy to use the measure, the thermometer, the calendar, why say "about?" In the history of a case as derived from the patient, it may do very well ; but in your own later notes it should never appear. One of the surprising and characteristic differences between most of the laity—even very intelligent men and women—and ourselves, is their inaccurate observation or non-observation of plain facts. This is due solely to the want of training of their natural senses, and is the best argument I can give you for the schooling of the senses.

I am well aware that during your collegiate course you will have only moderate opportunities to use Nature's gifts—in my day we had none at all—and that most I have said will rather apply to your post-collegiate course. But the accurate scientific habit or the shiftless unscientific habit will be begun and largely formed here, and it is generally true that what your habits are when you graduate, such they will be until Time shall administer his last anodyne and you pass into your long sleep.

Given the facts, accurately observed and carefully noted, what then? Then comes the highest art of the physician ; the reasoning process by which is evolved the diagnosis, upon which depends his treatment. He must take one plus one and make them into two, a *tertium quid* wholly distinct from either

of its constituent factors. And in medicine the two ones often lie far apart. They must be correlated not only in any individual case, but in cases years asunder, by a mental stereoscopic vision, the possession of the few, the envy of the many.

This logical faculty is partly inborn, it is true, and varies in natural strength as much as the natural acuity of vision; but it is also amenable in an immense degree to cultivation. The wider your knowledge the better your reasoning will be. You must at first laboriously toil over the process, as does the tyro in Euclid over each equation in every successive problem, over and over again. But when these steps have become as A, B, C to him, then he begins to leap, and finally, when a master geometer, his "therefore" clears a whole book at a bound. So with you, the halting method of your early days, if carefully purified from its faults and strengthened by constant and watchful repetition, will at length give way to quick perception; the correlated facts soon become as familiar to you as his old friends, X, Y, and Z are to the geometer, and with a mental "therefore," you, as quickly and as accurately, leap to your diagnosis, and thence to your treatment. Pains-taking and habitual induction slowly give place to intuition. To the laity it often seems so easy and takes so little time it is hardly worth paying much for. They should learn that it is like the ease of the accomplished athlete, the swordsman, the equestrian. As in a plant, the long roots are hidden; only the brilliant flower is seen.

Of treatment, the last and most important point of all—the "final cause" of there being any doctors at all—you will hear and see so much that I will only quote Broussais: "The real physician is the one who cures; the observation that does not teach the art of ealing is not that of a physician; it is that of a

'naturalist.'" And I add my commentary: "The observation of the naturalist must precede, as it ought to lead up to, the art of the physician."

You will be much tempted to devote yourself to one or two favorite branches, to which you perhaps think you will devote yourself later as specialists, and to neglect others. No greater mistake could be made. Few men follow their early selection of a career. Circumstances compel a change. This collegiate part of your course stands in the same relation to your later professional life that a common school education does to your general education.

Every one must know the three R's whatever he may be, "farmer, lawyer, doctor, chief." So every doctor must know chemistry, though he become a surgeon; the eye, though he practice medicine; the microscope, though he become an obstetrician; obstetrics, though he turn out a pathologist. Each is a strand in the stout medical rope, and without it the rest would be weak and worthless. You must "know something about everything, and everything about something." Every department of medicine must pay tribute to the one you finally select. As Bordeu quotes Iphicrates, the Athenian general, when asked why he was so proud: "Are you a soldier, a captain, an engineer, a spy, a pioneer, a sapper, a miner?" "No," said Iphicrates, "I am none of these, but I command them all."

3. The Post-collegiate period, or that of actual practice.

"Commencement" is not inaptly named, for it is the beginning of the work of life. I was not idle as a student, but I am sure that I have labored twice as hard since I have had my coveted sheepskin as I ever did to get it. "In nature," says Emerson, "nothing is ever given away. Everything is bought." For some things we pay dollars, for others, time; for

others, hard labor. Time and hard labor are the sure and only currency of the realm of medicine. These alone bring success. And by "success" I do not mean wealth, or influence, or fame, the presidency of this medical society, or a professorship in that medical college. Success is a relative term; related to our sphere in life and our opportunities. There is a dignity in mediocrity, as well as of greatness. The humble country doctor—like the Gideon Gray of Scott's Romance—if he has kept abreast of the times by after study, and has made the most of himself and his opportunities, has achieved true success. Let me now enumerate some of the means needful to this end; especially needful in view of the demands of the new era. •

A doctor who takes no medical journal is like the business man who takes no newspaper. Years after graduation he stands just where he did when dubbed an M.D., barring a certain amount of rule-of-thumb experience he may have obtained. He is like a mariner who would stick to Fulton's antiquated steamboat instead of an Atlantic liner. The medical newspaper stands in the same relation to medical books, that the daily newspaper does to works on history; the one gives us the current events and thoughts and discoveries of the time, sometimes true, sometimes false; the other consists of the sedimentary deposits, gradually hardening into the rock of well ascertained facts. To keep up with the rapid progress of medical science you must, therefore, first of all take as many medical journals, and also buy as many books as you can afford. Make a note of every paper of importance in an index rerum, or better by a card catalogue, such as is used in all our libraries. Skimp your table and your wardrobe that your mind may be fed and clothed. This is your capital in trade.

Carry with you into practice the habits of accuracy, the healthy use of your senses that you will begin here. Accept all the helps modern science has given and the many others yet to be added to them. Study each case, especially your early ones, till you know them as you know the topography of your own at that time too unfrequented office. One case thoroughly studied will do more to enlarge your knowledge and teach you methods than a score observed in a careless, slovenly manner. Make notes of every case you have, full notes for the important ones, slight for the trivial ones. What would I not give had some one offered me and had I heeded just this one bit of advice! Patients soon come to the man who is interested in each case, studies it thoroughly, and, therefore, as a rule, cures it surely and quickly.

Now, too, will come the time when you can remedy any defects of early education. If you do not know German and French, you should begin to acquire at least a reading knowledge of both, within a week after you have your diploma, possibly even before you get an office. You have conquered a new realm when you have acquired a new language. No medical man at the present day can, by any possibility, afford to be ignorant of at least these two. If he is, he simply must go to the rear. With these I must enter a plea for the sturdy sonorous Latin, and if possible some Greek. Never forget that ours is happily one of the "Learned Professions," and if we would be worthy of the name, some little classical, as well as scientific, learning should shed a halo around it. Not only is it needful for your very first prescription, and for the intelligent appreciation of most modern scientific terms, but it leads to the highest and noblest literature. If you have once tasted of the honey of Hymettus you will hardly be satisfied with the miserable crumbs found in many of the current and much

be-thumbed books of the day. A literature that has dominated the world for over twenty centuries has a right to claim some of your time.

Do not shelter yourselves behind the incessant work and endless drives of a "country doctor." I fear that many of our country doctors waste enough time in gossip and profitless discussions of the crops and politics, and what not besides, to make them excellent Latin scholars at least. Even the long drives alone, if rightly used, would suffice to add one or two languages to their literary furnishing. One of the most remarkable medical pictures of the time is that given by Dr. John Brown,* of Dr. Adams, of Banchory, a "country doctor" in a secluded Scotch village, with constant hard work on horseback, amid bleak hills and valleys for twenty miles around. Without ever neglecting his work he became one of the most accomplished linguists of his day, and at breakfast was fond of amusing himself by translating an ode of Horace into Greek verse.

A happy distinction has been made between the "Literature of Knowledge" and the "Literature of Power." Our science brings us so constantly into contact with the first that we are apt to neglect the second. Much of the literature of power you will find in Homer and Demosthenes, in Horace and Cicero, in Moliere and Goethe; but for a wide acquaintance with it you must naturally look to our mother tongue—and, happily, you do not look in vain. Chaucer and Shakespeare, Milton and Macaulay, Tennyson and Thackeray, Whittier and Longfellow, Webster and Irving, and the genial Oliver Wendell Holmes—one whom our own guild ever delights to honor—these will conduct you into the higher realms of thought, where you may soar undisturbed by care. "Some books," says Bacon, "are to be tasted, others to be swallowed, some few

to be chewed and digested." Read the books that are to be eaten and assimilated.

I urge this literary culture partly because it will afford endless delight, and broaden and inform the mind. In later life, when you have lost some of the fine enthusiasm of youth; when the years come that bring the philosophic mind, familiarity with such a literature will be a never-failing resource, for it never loses its charm. But I especially urge it because the new era in science demands that you be ready to report your cases, relate your discoveries, and discuss them before an intelligent public. To do this so that you will command a hearing, a good English style is indispensable. Few scientific men speak or write effectively. They are apt to be illogical in their methods, wanting in force in their arguments, discursive and inelegant in their style. If you will make the literature of power your companion, and then will write and then prune mercilessly, you will soon acquire such a command of English as will serve you many a good turn. The secret of Huxley's and of Tyndall's success lies as much in their forceful and elegant English as in their scientific acquisitions.

Beside all these scientific and literary demands, I cannot pass by those personal qualities that the age requires of every gentleman. Cultivate, therefore, neatness of apparel, a courtesy that is so apparent that it is extended to the humblest patient in as large measure as to the rich and influential. Appreciate that yours is not a trade in which to make the most money in the least time, but a generous profession, by which, it is true, you make a living, but also do far more. You give what money cannot pay for, and for which you will often never even ask for any sordid *quid pro quo*. Devotion to duty to the neglect of self, sympathy and succor in the hours of sorrow, cheerfulness that vanquishes despair, and skill that baffles

even death itself, these are not to be paid for by money, but by speaking eyes, grateful hearts, and well-cemented, life-long friendship and devotion.

Above all, cultivate that good old virtue, "common sense." It lies back of all your science. It is the bed rock on which all success is based.

Of your moral and religious duties I may add only a word. Medicine has to do with much more than the mere healing of human infirmities and disease. Its investigations carry you far beyond the animal kingdom, away down to the lowest vegetable organisms, which bacteriology has shown to be such important factors in disease; its practice has to do with the health and highest happiness of vast communities, as well as the welfare of each individual, with all his various ties and relations, in one complex social life; and its speculations carry you far above and beyond the hour of death. We assist at the beginning of the earthly life in its frail cradle; we see its very close when we watch the last respiration and feel the last pulse beat. That this is not the "be-all and the end-all" of a human soul, both Holy Writ and our own inner convictions imperiously assert. If we could but discern it, we have really assisted at the beginning of a second and the greater life—the Eternal Life. Mindful, then, of our high calling, we should be thoughtful and religious men, ever asking for the Divine help in our daily round of duties.

When I began writing I had intended to speak at length also of the demand of the new era in medicine upon our medical colleges. Time, however, will only allow of a brief, but most important allusion to it. To this demand the colleges are slowly responding. But the change should be more general, more rapid, and more radical.

It is one of the most healthful signs of the times that it is in the larger and more advanced schools,

the very ones that are best equipped as to men, money, buildings, and laboratories, that there exists the greatest unrest and dissatisfaction with present achievements, and the chief reaching forward to better and larger things, and among them stands the Jefferson Medical College. While conservative, she is progressive; "*Nulla vestigia retrorsum*" is her motto. That she is alive to the need of progress and has met it in the past, the contrast I have described between my own student life and yours gives ample proof. That the new era in medicine demands still more she recognizes, and, as you will have seen by the announcement, she again meets the demand. To your joy no less than to mine, for the student-mind is ever alert to notice signs of progress, this year we inaugurate a full and required three years' graded course. Time was when the comparatively narrow field could be reaped in two combined hearty attacks. Even then it was hard work; but now it has become simply impossible. The profession and this college alike recognize it, and accordingly we provide for it. If, with increasing branches of science, and increased demand for a deeper as well as a wider knowledge, a reasonable experience shall, as I believe it will, conclusively show that more is needed, I am persuaded that the Jefferson College will recognize that need, and provide for it in due time.

In connection with this progressive step, I am glad to be able to announce to you that, during my late visit abroad, I had an interview with Mr. Hallett, the courteous and intelligent Secretary of the Conjoint Board of Examination of the Royal College of Physicians of London and the Royal College of Surgeons of England, and that these two colleges have accorded to the diploma of the Jefferson Medical College precisely the same rights and privileges that are ac-

corded to the diploma of the universities of Paris, Berlin, Bologna, and all the best foreign schools.

As an earnest of the progressive disposition of this college, I have also the honor of making to you another announcement. Within a short time, the wise forethought of the Board of Trustees has been well shown in the purchase of a lot eighty-two feet in front on Walnut street, south of the hospital, upon which a new and commodious college building will be erected, an ornament to the city, and a more active center of scientific life. Nor will the old and battered college building be given up to baser uses. Hallowed by the memories of McClellan, Dickson, Mütter, Bache, Pancoast, Dunglison, Gross, and scores and hundreds, yea, even thousands, of earnest teachers and pupils, and remodeled, it will take a new lease of useful life by gathering under its hospitable roof the many well equipped laboratories of the college, all of them the product of the last twenty-five years. This is happy news, especially to the workers in the ill-equipped, insufficient quarters of the past, which yet have been the scenes of persistent, patient, and most useful scientific work.

But to erect a new college building and alter another, and equip the laboratories, will take money, and a deal of money. For this we must appeal largely to the generous sympathies of a community long noted for its intelligent benevolence. Yet it is an odd fact, to which I call especial attention, that, while to academies, colleges, seminaries, and other institutions of learning, millions have been given, and to hospitals scores of millions, yet, to fit the men who are to serve these very hospitals, to educate the doctors who are to have the health and lives of the whole community in their care, nothing has ever been given until of late. At last we are awakening to the fact that good doctors are as important as good teachers and preach-

ers, and that physical health is no less important than mental development. To erect suitable buildings for an important medical school, and to equip and endow its laboratories and museum, is as much a work of philanthropy, and brings back ultimately to the community as large a return as similar gifts to academic institutions or to hospitals. We have already hospitals and dispensaries, and asylums and homes in excess of the needs of the community. What is needed now is the strengthening and development of the *medical schools* which educate the men who make the hospitals useful; the endowment of laboratories in which original research will continue for all time; researches which will repay for their outlay a thousand-fold; and the establishment of scholarships and fellowships, to enable young men whose devotion to a scientific career is hindered and often blighted for want of reasonable pecuniary help. For these innovations and encouragements we now ask money, and the indications are that the community is alive to the need for them. The recent endowment of the Chair of Surgery in the University of Pennsylvania, the erection of the new buildings at Harvard and New York, the establishment of the Carnegie, the Loomis, and the Hoagland laboratories, and especially the magnificent gifts of the Vanderbilt family and of Johns Hopkins at Baltimore—all these are encouraging signs.

The Jefferson now boldly proclaims its work, and asks for similar help. The new era in medicine compels us to enlarge our facilities, and this wider and better instruction will benefit the public at large. To them we appeal confidently, knowing that they will not disregard an appeal founded alike in justice, mercy, and charity.

And the reasons urging on this college to these large and wise advances apply equally to the other

medical schools, and to the profession at large. The demands of the new era in medicine will only be complied with when the medical colleges give all the necessary facilities in equipment and in time to study thoroughly every branch of medicine, and the student comes to the college with a suitable preliminary education, avails himself during his college course of the ample means provided there, and after graduation grows into the cultured and experienced doctor by the means and methods I have pointed out.



